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Field patterns of whispering-gallery and bow-tie modes of elliptic microcavity lasers with circular active regions

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Abstract

© 2016 IEEE.We investigated the lasing spectra, threshold gain values, and modal fields of two-dimensional elliptical microcavity lasers with centrally located circular active regions. Our numerical experiments were based on the Muller boundary equations solved by the Nystrom method. They showed that the whispering gallery modes (WGM) and the bow-tie modes (BTM) exist in such resonators. We studied the field patterns and the lasing characteristics as a function of the radius of the active region. The calculations demonstrated that the radius of the active region can be used as a tool for manipulating the threshold gains of both BTM and WGM.

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Keywords

boundary integral equations, laser modes, laser resonators, Nystrom method, threshold gain